flower should be fertilised by pollen from the wild fig, or caprifig. The pollen is conveyed by an insect, *Blastophaga grossorum*, which goes through its various stages of growth in the wild fig. It is the practice in Smyrna and other fig-growing countries to break off the fruits of the caprifig, and tie them to the limbs of the edible fig tree, at the time when the flower receptacles of the latter are in a suitable condition. The result is the production of figs far larger and finer than would be obtained without this operation. The American report gives a brief history of our knowledge on this subject, and a detailed account of the introduction of the Smyrna fig into California, the subsequent introduction of the caprifig, and the final successful introduction, after several failures of the insect, with details of the work done during the season of 1899, when the first crop of figs fully equal to the imported article was obtained. For the successful fertilisation of the Smyrna fig it is necessary that the caprifig should blossom at the same time as the Smyrna fig, and that the winged female insect should also at the same time be emerging from the galls containing the pupa. These adjustments are liable to be disturbed by variations in climate and season, and require careful study and skilled scientific superintendence if fig culture is to be successfully introduced into a new country.

The report on the cultivation of the date palm is also of great interest. A full account is given of the conditions under which the finest dates are produced in Algeria and the Sahara, and of the steps which have been taken to introduce the best varieties of the date palm into Arizona and other suitable climates in the United States. It is shown that the best varieties can only be introduced by means of offshoots, the plants grown from seed being very various in character. Different climates require the choice of different varieties. The tree has the great merit of flourishing in climates in which the summer is too hot and too dry to permit of ordinary cultivation ; it flourishes even in soils impregnated with alkali salts, a condition frequently met with in dry climates. The report should be of considerable value to the Agricultural Department of our Indian Empire, where vast areas of waste alkali land are still waiting to be dealt with.

There is one more report, of special interest in connection with the present summer, of which we will briefly speak : its subject is hot waves, the conditions which produce them and their effect on agriculture. The continent of North America is at present admirably suited for the study of meteorological phenomena , the observers cover an immense area, and are all in telegraphic communication with the Central Weather Bureau at Washington. The report in question includes the study of three remarkable periods of heat, and is illustrated by maps showing the distribution of pressure and temperature over the continent during these periods. The first point that strikes one is the unsuitableness of the phrase "hot wave." The heat periods are, indeed, periods of stagnation in the atmosphere. The conditions appear to be similar in each instance which is discussed. There is an area of moderately high pressure in the subtropical region towards the south-east ; an area of moderately low pressure in the northern central States, and a second area of high pressure on the west or north-west coast. These conditions are steadily maintained during the hot period. There is, of course, a slow flow of air from the subtropical, south-eastern area of high pressure to the central or north-central area of low pressure. The extreme temperatures occur between these two regions. The great heat is not simply due to air coming from a warm region ; it is largely due to the clear sky affording full opportunity for the receipt of solar energy, and to the small radiation during the night from the earth's surface ; the hot nights are, indeed, a striking feature of these periods. What is the cause of this absence of night radiation with an apparently clear sky? It appears to be due to the presence of a large quantity of transparent water vapour in the higher regions of the atmosphere, which allows the passage of solar radiation but forbids the return of the lower grade heat waves of terrestrial radiation.

R. WARINGTON.

SCHOOL HYGIENE.

School Hygiene. By Edward Shaw, Professor of the Institutes of Pedagogy, New York University. Pp. 260. (London : Macmillan and Co., Ltd., 1901.) 4*s.* 6*d.* net.

A Manual of School Hygiene. By E. W. Hope, M.D., Professor of Hygiene, University College, Liverpool, and E. A. Browne, F.R.C.S.E., Lecturer of Ophthalmology, University College, Liverpool. Pp. 207. (Cambridge : University Press, 1901.) 3*s.* 6*d.* net.

IT has been the aim of the authors of these two works to set forth the conditions which should surround school pupils in order that their mental and physical health may be promoted. No true education in mental training can overlook the hygienic and physical relationship of mind and body, and no knowledge must be conveyed at the expense of physical and moral development ; for it is true, as Mr. Herbert Spencer has reminded us, that the essential object of education is to teach us how to live happily. Moreover, the connection between physical health and the power of voluntary control and, consequently, of conduct, is very close, and perfect mental development cannot be brought about if the opportunity is not given for healthy physical development. Notwithstanding the general acceptance of these truisms, school buildings are still being erected with a view mainly to exterior effect, and an adequate system of ventilation in the crowded class-rooms is rarely to be met with. As Prof. Shaw has pointed out, the school-room should be the unit first to be considered in planning the school building, and the building should be a number of school-rooms properly disposed, and not a whole cut up into school-rooms whose size and arrangement are dependent upon the size and shape of the building.

The guiding principles of hygiene, so far as it is affected by the circumstances of school life, are well and clearly set forth in both books, and the essential facts of school health are brought within the easy reach of the parent or teacher. To do their duty in this respect, no great amount of detail knowledge is necessary, but rather one of general principles combined with an intelligent observation of children with the view of detecting

those influences which tend to do harm. Many details in the practical work of the school are of the greatest hygienic importance, and these can only be directed by the teacher, who should recognise that it is the first duty of an educational system to promote good health among the scholars, and, indeed, that the success of any particular school is reflected in the physical health of those attending it as well as in their mental attainments.

"A Manual of School Hygiene" consists of two parts. In Part i., written by Prof. E. W. Hope, there are chapters upon site and soil, the school building, air, ventilation and warming, food and clothing, sickness, the personal aspect of infection, accidents and emergencies. Part ii. is written by Mr. E. A. Browne, and deals with the care of the eye, school furniture and writing, the air passages, exercise, over-pressure and the general management of health. The subjects of Part i. are not always treated with sufficient detail to meet the purposes of an elementary text-book. For instance, it is not sufficient to state that "other simple inlets for fresh air may be mentioned, such as Tobin's tubes, Louvres, Sherringham valves, Cooper's discs, &c." (p. 33); and again, that house drains "should be laid at such an inclination as will secure a velocity of not less than three feet per second, and the diameter should be four or six inches in accordance with the number of lavatories discharging into it" (p. 10). Many other instances could be quoted in which the matter given will convey little real information to one who already knows little or nothing of the subject. Owing to a hasty revision of the proof sheets, the carbonic acid of the general atmosphere is given as 0·4 per cent. on p. 16.

The treatment of the subjects of Part ii. is wholly excellent; the matter is scientifically sound, clearly written and sufficient, and it might well serve as a model to other text-books which deal with corresponding branches of school hygiene. We would commend Mr. Browne's definition of "over-pressure" as a very happy one; it is "a failure to reach the potentiality of the bodily and mental strength of any given child"; and every school teacher would do well to keep before him the writer's statement that "the holidays may be needed for the teachers, they may be desirable for the maintenance of home life and family ties, but they should be entirely superfluous in the matter of health."

The long range of subject-matter comprised within the title, "School Hygiene," is also dealt with a little unevenly in Prof. Shaw's work. The book contains some excellent chapters, notably those dealing with school furniture, postures, physical exercises and handwriting; but those dealing with sites and foundations of schools and sanitary fitments are somewhat poor, and generally insufficient. The reader will be puzzled by the reference, in the chapter dealing with ventilation, to "the well-known device of placing a board between the sashes of the window," and the scientific reader will not approve of the statement that the soil of the site should be free from organic matter. The book, however, is one which contains a great deal of valuable and well-expressed material, and it should be read by all those whose duty it is to be conversant with the subject of school hygiene. It is well printed, excellently illustrated, and contains a good bibliographical appendix.

OUR BOOK SHELF.

Illustrations of the Botany of Captain Cook's Voyage Round the World in H.M.S. "Endeavour" in 1768–1771. By the Right Hon. Sir Joseph Banks and Dr. Daniel Solander, with Determinations by James Britten, F.L.S., Senior Assistant, Department of Botany, British Museum. Part II.: Australian Plants. (London: Printed by order of the Trustees of the British Museum, 1901.)

THE first part of this work was noticed in NATURE, lxii. p. 547, October 1900, to which we may refer for explanations of its scope and character, as well as for some criticisms of the nomenclature and other points. The present part consists of plates 101 to 243, with descriptive letterpress, and illustrates the natural orders Myrtaceæ to Labiatæ, arranged after Bentham and Hooker's "Genera Plantarum." When complete, this work will be a great help to the botanists of East Australia, as it will comprise a considerable selection of the plants of the coast region from Cape Howe to Cape York. Almost all the natural orders are represented, though somewhat unequally. Thirteen genera of Myrtaceæ are figured, for example, and they include eight which are characteristically Australian. Nine species of the delicate and elegant genus *Utricularia* are also among those represented. In the way of names, such familiar genera as *Barringtonia*, *Careya*, *Sesuvium*, *Spermacoce*, *Olearia*, *Wahlenbergia*, *Trichodesma*, *Clerodendron* and *Plectranthus* are superseded by the obscure and usually less euphonious appellations of *Huttum*, *Cumbia*, *Halimum*, *Tardavel*, *Shawia*, *Cervicina*, *Borraginoides*, *Siphonanthus* and *Germanea*, respectively, on the ground of priority, often for a single species. Fortunately for the ordinary botanist and gardener, these and numerous other changes are not binding, and most of them are not recognised by Kew, Berlin and other botanical establishments which greatly influence the horticultural world. But the saviours of the familiar names are the nurserymen, who are careful not to mislead and mystify their customers by using fresh names for old plants. W. BOTTING HEMSLEY.

Essays on the Theory of Numbers. I. Continuity and Irrational Numbers. II. The Nature and Meaning of Numbers. By Richard Dedekind. Authorised translation by W. W. Beman. Pp. 116. (Chicago: The Open Court Publishing Co.; London: Kegan Paul and Co., Ltd., 1901).

IN the first of these tracts Prof. Dedekind gives a theory of irrational numbers and of the arithmetical *continuum* which is logically perfect, and in form, perhaps, more simple and direct than any other which has been or could be suggested; in the second he proceeds, by a marvellous chain of subtle inferences, from the idea of a *manifold* (or system of distinguishable objects in the widest sense) to the series of natural numbers and the elementary operations of arithmetic. It is to be hoped that the translation will make the essays better known to English mathematicians; they are of the very first importance, and rank with the work of Weierstrass, Kronecker and Cantor in the same field. The translation is rather painfully literal, and does not convey much idea of the graceful style of the original; but it is, on the whole, correct. On p. 46, l. 15, "hereafter" is a wrong rendering of *hierauf*; on p. 52, l. 18, $\psi(s')$ and s should be $\psi(S')$ and S; p. 61, last line but one, "such" is superfluous. On p. 34 there is an amusing complication of errors. What the author means is, "In this sense" (or "in the light of this fact"), "which I wish to express by the words ἀεὶ ὁ ἄνθρωπος ἀριθμητίζει, formed after a well-known saying, I hope," &c. The reference is to the motto on the title-page of the German edition, which was coined by the author in imitation of the Platonic dictum, ἀεὶ ὁ θεὸς γεωμετρίζει. M.